



CIVIL QUALITY CONSULTANTS & ENGINEERS

(Buildings Geo-Tech & Highway Materials Testing Laboratory)
An ISO 9001: 2015 Certified Company
NABL Accredited As Per ISO/IEC : 17025:2005 Laboratory



Job No.: CQCE/BBMP/CTR/W.No.17/2020-21

Date: 08.02.2021

Aggregate Impact Value

Client	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore.
Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	384	
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	84	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	298	298	
4	Aggregate Impact value = percent fines			
	$100 * (W_2/W_1)$ percent	21.99	22.40	22.19

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

Note:

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For CIVIL QUALITY CONSULTANTS & ENGINEERS

Authorised Signatory

Office & Laboratory : # 133, Bhuvaneshwarinagar, Dodda Basti Main Road, Bangalore - 560 056.
e-mail: civilqualityconsultants@gmail.com Ph: 080-23240644 / Mob: 8553518550



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Date: 08.02.2021

Aggregate Impact Value

Client	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore.
Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g			
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	386	388	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	89	87	
4	Aggregate Impact value = percent fines	297	301	
	$100 * (W_2/W_1)$ percent			
		23.06	22.42	22.74

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24% (MORTH table no.500.16)

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Date: 08.02.2021

Aggregate Impact Value

Client	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore.
Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	383	385	
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	82	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	21.41	21.82	21.61
	$100 * (W_2/W_1)$ percent			

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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Aggregate Impact Value

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Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	387	
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	88	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	22.62	22.22	22.42
	$100 * (W_2/W_1)$ percent			

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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Date : 08.02.2021

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Executive Engineer , R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore.
Name of Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	12.6	10.9	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	11.3	14.5	
	Combined Flakiness & Elongation index	23.90	25.40	

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[Handwritten signature]
Authorised Signatory

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Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	11.5	10.7	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	10.3	11.4	
	Combined Flakiness & Elongation index	21.80	22.10	

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Client	Executive Engineer , R R Nagara Division, BBMP, Bangalore.
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Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	10.2	11.7	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	11.8	10.5	
	Combined Flakiness & Elongation index	22.00	22.20	

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Date : 08.02.2021

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Executive Engineer , R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore.
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Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	11.9	10.7	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	10.6	11.6	
	Combined Flakiness & Elongation index	22.50	22.30	

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Job No.: CQCE/BBMP/CTR/W.No.17/2020-21

Date : 10.02.2021

Specific Gravity And Water Absorption Test

Client	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore.
Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV. (10), BBMP, Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021 to 10.02.2021

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	$W_1 g$	2018	2020	2022	
2	Weight of basket suspended in water	$W_2 g$	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s g$	1263	1265	1267	
4	Weight of saturated surface dry aggregate in air	$W_3 g$	2014	2015	2017	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s) g$	751	750	750	
6	Weight of oven dried aggregate	$W_4 g$	2006	2008	2010	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.671	2.677	2.680	2.676
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.700	2.703	2.705	2.703
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.40%	0.35%	0.35%	0.37%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0% (MORTH table 500.16)

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Job No.: CQCE/BBMP/CTR/W.No 17/2020-21

Date : 08.02.2021

Aggregate Gradation Test IS 2386 Part I

Client	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore
Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No 17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
BIS Code	IS 2386(Part I)-1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	412	8.24	8.24	91.76	90 - 100	
9.5	496	9.92	18.16	81.84	70 - 88	
4.75	621	12.42	30.58	69.42	53 - 71	
2.36	668	13.36	43.94	56.06	42 - 58	
1.18	558	11.16	55.10	44.90	34 - 48	
0.600	541	10.82	65.92	34.08	26 - 38	
0.300	493	9.86	75.78	24.22	18 - 28	
0.150	336	6.72	82.50	17.50	12 - 20	
0.075	471	9.42	91.92	8.08	4 - 10	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	421	8.42	8.42	91.58	90 - 100	
9.5	512	10.24	18.66	81.34	70 - 88	
4.75	653	13.06	31.72	68.28	53 - 71	
2.36	547	10.94	42.66	57.34	42 - 58	
1.18	569	11.38	54.04	45.96	34 - 48	
0.600	512	10.24	64.28	35.72	26 - 38	
0.300	674	13.48	77.76	22.24	18 - 28	
0.150	163	3.26	81.02	18.98	12 - 20	
0.075	588	11.76	92.78	7.22	4 - 10	

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Aggregate Gradation Test IS : 2386 Part I

Client	Executive Engineer , R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore.
Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
BIS Code	IS 2386(Part I):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	418	8.36	8.36	91.64	90 - 100	
9.5	487	9.74	18.10	81.90	70 - 88	
4.75	625	12.50	30.60	69.40	53 - 71	
2.36	654	13.08	43.68	56.32	42 - 58	
1.18	567	11.34	55.02	44.98	34 - 48	
0.600	543	10.86	65.88	34.12	26 - 38	
0.300	491	9.82	75.70	24.30	18 - 28	
0.150	328	6.56	82.26	17.74	12 - 20	
0.075	464	9.28	91.54	8.46	4 - 10	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	424	8.48	8.48	91.52	90 - 100	
9.5	508	10.16	18.64	81.36	70 - 88	
4.75	652	13.04	31.68	68.32	53 - 71	
2.36	539	10.78	42.46	57.54	42 - 58	
1.18	551	11.02	53.48	46.52	34 - 48	
0.600	506	10.12	63.60	36.40	26 - 38	
0.300	687	13.74	77.34	22.66	18 - 28	
0.150	155	3.10	80.44	19.56	12 - 20	
0.075	594	11.88	92.32	7.68	4 - 10	

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Aggregate Gradation Test IS : 2386 Part I

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Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
BIS Code	IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	407	8.14	8.14	91.86	90 - 100	
9.5	472	9.44	17.58	82.42	70 - 88	
4.75	614	12.28	29.86	70.14	53 - 71	
2.36	649	12.98	42.84	57.16	42 - 58	
1.18	553	11.06	53.90	46.10	34 - 48	
0.600	532	10.64	64.54	35.46	26 - 38	
0.300	488	9.76	74.30	25.70	18 - 28	
0.150	359	7.18	81.48	18.52	12 - 20	
0.075	497	9.94	91.42	8.58	4 - 10	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	421	8.42	8.42	91.58	90 - 100	
9.5	516	10.32	18.74	81.26	70 - 88	
4.75	647	12.94	31.68	68.32	53 - 71	
2.36	528	10.56	42.24	57.76	42 - 58	
1.18	549	10.98	53.22	46.78	34 - 48	
0.600	513	10.26	63.48	36.52	26 - 38	
0.300	697	13.94	77.42	22.58	18 - 28	
0.150	186	3.72	81.14	18.86	12 - 20	
0.075	604	12.08	93.22	6.78	4 - 10	

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Client	Executive Engineer , R R Nagara Division, BBMP, Bangalore.
Agency	Sri C T Raju, Contractor, Bangalore.
Name of the Work	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
BIS Code	IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	08.02.2021

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	415	8.30	8.30	91.70	90 - 100	
9.5	469	9.38	17.68	82.32	70 - 88	
4.75	608	12.16	29.84	70.16	53 - 71	
2.36	655	13.10	42.94	57.06	42 - 58	
1.18	543	10.86	53.80	46.20	34 - 48	
0.600	537	10.74	64.54	35.46	26 - 38	
0.300	498	9.96	74.50	25.50	18 - 28	
0.150	357	7.14	81.64	18.36	12 - 20	
0.075	509	10.18	91.82	8.18	4 - 10	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	404	8.08	8.08	91.92	90 - 100	
9.5	519	10.38	18.46	81.54	70 - 88	
4.75	652	13.04	31.50	68.50	53 - 71	
2.36	524	10.48	41.98	58.02	42 - 58	
1.18	553	11.06	53.04	46.96	34 - 48	
0.600	518	10.36	63.40	36.60	26 - 38	
0.300	688	13.76	77.16	22.84	18 - 28	
0.150	179	3.58	80.74	19.26	12 - 20	
0.075	612	12.24	92.98	7.02	4 - 10	

Note:

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[Signature]

[Signature]

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Job No: CQCE/BBMP/CTR/W.No.17/2020-21

Date: 11.02.2021



TEST REPORT ON STABILITY OF MIX

Client	:	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
Agency	:	Sri C T Raju, Contractor, Bangalore.
Name of the Work	:	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	11.02.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.96	10.51	9 Kn (min)
2	Marshal flow, mm	3.15	2.92	2 - 4
3	Percent air voids in Mineral Aggregate	13.82	14.48	13 - 15
4	Voids in Compacted Mix	3.60	4.37	3 - 6
5	Percent Voids filled with Bitumen	66.33	69.10	65 - 75
6	Density, g/cc	2.26	2.27	--

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Job No.: CQCE/BBMP/CTR/W.No.17/2020-21

Date: 11.02.2021

TEST REPORT ON STABILITY OF MIX

Client	:	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
Agency	:	Sri C T Raju, Contractor, Bangalore.
Name of the Work	:	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	11.02.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.33	10.40	9 Kn (min)
2	Marshal flow, mm	3.18	2.32	2 - 4
3	Percent air voids in Mineral Aggregate	13.96	14.98	13 - 15
4	Voids in Compacted Mix	3.20	4.48	3 - 6
5	Percent Voids filled with Bitumen	66.11	69.65	65 - 75
6	Density, g/cc	2.27	2.25	--

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Job No.: CQCE/BBMP/CTR/W.No.17/2020-21

Date: 12.02.2021

TEST REPORT ON STABILITY OF MIX

Client	:	Executive Engineer , R R Nagara Division, BBMP, Bangalore.
Agency	:	Sri C T Raju, Contractor, Bangalore.
Name of the Work	:	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	12.02.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1.	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.12	10.10	9 Kn (min)
2	Marshal flow, mm	3.25	2.64	2 - 4
3	Percent air voids in Mineral Aggregate	13.39	14.95	13 - 15
4	Voids in Compacted Mix	3.82	4.63	3 - 6
5	Percent Voids filled with Bitumen	66.74	69.24	65 - 75
6	Density, g/cc	2.25	2.27	--

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Date: 12.02.2021

TEST REPORT ON STABILITY OF MIX

Client	:	Executive Engineer , R R Nagara Division, BBMP, Bangalore.
Agency	:	Sri C T Raju, Contractor, Bangalore.
Name of the Work	:	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	12.02.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.54	10.49	9 Kn (min)
2	Marshal flow, mm	3.63	2.50	2 - 4
3	Percent air voids in Mineral Aggregate	13.28	14.12	13 - 15
4	Voids in Compacted Mix	3.71	4.93	3 - 6
5	Percent Voids filled with Bitumen	66.96	69.64	65 - 75
6	Density, g/cc	2.27	2.26	--

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Job No.: CQCE/BBMP/CTR/W.No.17/2020-21

Date: 13.02.2021

TEST REPORT ON STABILITY OF MIX

Client	:	Executive Engineer, R'R Nagara Division, BBMP, Bangalore.
Agency	:	Sri C T Raju, Contractor, Bangalore.
Name of the Work	:	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	13.02.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.35	10.56	9 Kn (min)
2	Marshal flow, mm	3.96	2.39	2 - 4
3	Percent air voids in Mineral Aggregate	13.71	14.50	13 - 15
4	Voids in Compacted Mix	3.52	4.30	3 - 6
5	Percent Voids filled with Bitumen	66.04	69.18	65 - 75
6	Density, g/cc	2.25	2.27	--

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Date: 13.02.2021

TEST REPORT ON STABILITY OF MIX

Client	:	Executive Engineer , R R Nagara Division, BBMP, Bangalore.
Agency	:	Sri C T Raju, Contractor, Bangalore.
Name of the Work	:	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	13.02.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.12	10.92	9 Kn (min)
2	Marshal flow, mm	3.34	2.10	2 - 4
3	Percent air voids in Mineral Aggregate	13.45	14.96	13 - 15
4	Voids in Compacted Mix	3.56	4.89	3 - 6
5	Percent Voids filled with Bitumen	66.67	69.78	65 - 75
6	Density, g/cc	2.26	2.27	--

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Job No: CQCE/BBMP/CTR/W.No-17/2020-21 Date: 11-02-2021



BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
AGENCY	Sri C T Raju, Contractor, Bangalore.
NAME OF THE WORK	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	11.02.2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473	472.5
3. Weight of Asphalt and Mineral matter Extracted, g	27	27.5
4. Weight of Mineral Matter, g	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27	27.5
7. Bitumen content in %	5.40	5.50
8. Average	5.45	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	15.3	15.3	3.2	96.8	90 - 100
9.5	61.2	76.5	16.2	83.8	70 - 88
4.75	94.8	171.3	36.2	63.8	53 - 71
2.36	42.3	213.6	45.2	54.8	42 - 58
1.18	44.7	258.3	54.6	45.4	34 - 48
0.600	52.1	310.4	65.6	34.4	26 - 38
0.300	46.3	356.7	75.4	24.6	18 - 28
0.150	32.1	388.8	82.2	17.8	12 - 20
0.075	48.7	437.5	92.5	7.5	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	22.3	22.3	4.7	95.3	90 - 100
9.5	65.9	88.2	18.7	81.3	70 - 88
4.75	91.4	179.6	38.0	62.0	53 - 71
2.36	48.5	228.1	48.3	51.7	42 - 58
1.18	50.1	278.2	58.9	41.1	34 - 48
0.600	53.6	331.8	70.2	29.8	26 - 38
0.300	44.9	376.7	79.7	20.3	18 - 28
0.150	31.5	408.2	86.4	13.6	12 - 20
0.075	32.3	440.5	98.2	6.8	4 - 10

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
AGENCY	Sri C T Raju, Contractor, Bangalore.
NAME OF THE WORK	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	11.02.2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473	472
3. Weight of Asphalt and Mineral matter Extracted, g	27	28
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27	28
7. Bitumen content in %	5.40	5.60
8. Average	5.50	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	18.2	18.2	3.8	96.2	90 - 100
9.5	60.5	78.7	16.6	83.4	70 - 88
4.75	93.1	171.8	36.3	63.7	53 - 71
2.36	44.7	216.5	45.8	54.2	42 - 58
1.18	42.1	258.6	54.7	45.3	34 - 48
0.600	55.9	314.5	66.5	33.5	26 - 38
0.300	45.3	359.8	76.1	23.9	18 - 28
0.150	33.2	393	83.1	16.9	12 - 20
0.075	41.2	434.2	91.8	8.2	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	21.2	21.2	4.5	95.5	90 - 100
9.5	68.9	90.1	19.1	80.9	70 - 88
4.75	92.3	182.4	38.6	61.4	53 - 71
2.36	47.4	229.8	48.7	51.3	42 - 58
1.18	52.3	282.1	59.8	40.2	34 - 48
0.600	51.6	333.7	70.7	29.3	26 - 38
0.300	42.1	375.8	79.6	20.4	18 - 28
0.150	32.6	408.4	86.5	13.5	12 - 20
0.075	30.5	438.9	93.0	7.0	4 - 10

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
AGENCY	Sri C T Raju, Contractor, Bangalore
NAME OF THE WORK	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	12.02.2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473.5	472
3. Weight of Asphalt and Mineral matter Extracted, g	26.5	28
4. Weight of Mineral Matter, g	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	26.5	28
7. Bitumen content in %	5.30	5.60
8. Average	5.45	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	12.2	12.2	2.6	97.4	90 - 100
9.5	65.3	77.5	16.4	83.6	70 - 88
4.75	98	175.5	37.1	62.9	53 - 71
2.36	46	221.5	46.8	53.2	42 - 58
1.18	42.3	263.8	55.7	44.3	34 - 48
0.600	51.1	314.9	66.5	33.5	26 - 38
0.300	43.9	358.8	75.8	24.2	18 - 28
0.150	32.1	390.9	82.6	17.4	12 - 20
0.075	49.2	440.1	92.9	7.1	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	12.2	12.2	2.6	97.4	90 - 100
9.5	65.3	77.5	16.4	83.6	70 - 88
4.75	98	175.5	37.2	62.8	53 - 71
2.36	46	221.5	46.9	53.1	42 - 58
1.18	42.3	263.8	55.9	44.1	34 - 48
0.600	51.1	314.9	66.7	33.3	26 - 38
0.300	43.9	358.8	76.0	24.0	18 - 28
0.150	32.1	390.9	82.8	17.2	12 - 20
0.075	49.2	440.1	93.2	6.8	4 - 10

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
AGENCY	Sri C T Raju, Contractor, Bangalore.
NAME OF THE WORK	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	12.02.2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473	472
3. Weight of Asphalt and Mineral matter Extracted, g	27	28
4. Weight of Mineral Matter, g	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27	28
7. Bitumen content in %	5.40	5.60
8. Average	5.50	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	18.2	18.2	3.8	96.2	90 - 100
9.5	69.3	87.5	18.5	81.5	70 - 88
4.75	81.4	168.9	35.7	64.3	53 - 71
2.36	78.2	247.1	52.2	47.8	42 - 58
1.18	45.1	292.2	61.8	38.2	34 - 48
0.600	50.6	342.8	72.5	27.5	26 - 38
0.300	32.6	375.4	79.4	20.6	18 - 28
0.150	33.1	408.5	86.4	13.6	12 - 20
0.075	38.2	446.7	94.4	5.6	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	36.2	36.2	7.7	92.3	90 - 100
9.5	62.1	98.3	20.8	79.2	70 - 88
4.75	92.5	190.8	40.4	59.6	53 - 71
2.36	47.8	238.6	50.6	49.4	42 - 58
1.18	45.1	283.7	60.1	39.9	34 - 48
0.600	55.9	339.6	71.9	28.1	26 - 38
0.300	42.1	381.7	80.9	19.1	18 - 28
0.150	26.5	408.2	86.5	13.5	12 - 20
0.075	35.9	444.1	94.4	5.9	4 - 10

Note:

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For CIVIL QUALITY CONSULTANTS & ENGINEERS

Office & Laboratory : # 133, Bhuvaneshwarinagar, Dodda Basti Main Road, Bangalore - 560 056.
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CIVIL QUALITY CONSULTANTS & ENGINEERS

(Buildings Geo-Tech & Highway Materials Testing Laboratory)

An ISO 9001: 2015 Certified Company

NABL Accredited As Per ISO/IEC : 17025:2005 Laboratory
Job No: CQCE/BBMP/CTR/Div.17/2020-21 Date: 13/02/2021



BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Executive Engineer, R.R. Nagar Division, BBMP, Bangalore.
AGENCY	Sri C.T. Raju, Contractor, Bangalore.
NAME OF THE WORK	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No 17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	13/02/2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473	472.5
3. Weight of Asphalt and Mineral matter Extracted, g	27	27.5
4. Weight of Mineral Matter, g	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27	27.5
7. Bitumen content in %	5.40	5.50
8. Average	5.45	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	17.1	17.1	3.6	96.4	90 - 100
9.5	66.9	84	17.8	82.2	70 - 88
4.75	93.2	177.2	37.5	62.5	53 - 71
2.36	48.7	225.9	47.8	52.2	42 - 58
1.18	42.3	268.2	56.7	43.3	34 - 48
0.600	55.6	323.8	68.5	31.5	26 - 38
0.300	45.8	369.6	78.1	21.9	18 - 28
0.150	32.1	401.7	84.9	15.1	12 - 20
0.075	32.6	434.3	91.8	8.2	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	18.5	18.5	3.9	96.1	90 - 100
9.5	62.1	80.6	17.1	82.9	70 - 88
4.75	96.8	177.4	37.5	62.5	53 - 71
2.36	45.7	223.1	47.2	52.8	42 - 58
1.18	52.3	275.4	58.3	41.7	34 - 48
0.600	51.4	326.8	69.2	30.8	26 - 38
0.300	45.6	372.4	78.8	21.2	18 - 28
0.150	32.1	404.5	85.6	14.4	12 - 20
0.075	35.8	440.3	93.2	6.8	4 - 10

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For CIVIL QUALITY CONSULTANTS & ENGINEERS

Authorised Signatory

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Job No: CQCR/BBMP/CTR/W.No.17/2020-21 Date: 13.02.2021



BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Executive Engineer, R R Nagara Division, BBMP, Bangalore.
AGENCY	Sri C T Raju, Contractor, Bangalore.
NAME OF THE WORK	Comprehensive development of roads, drains and footpath in HMT Layout, SBM Colony and Surrounding Areas in Ward No.17 under PACKAGE-2019-20 RRN-DIV-(10), BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	13.02.2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	472	473
3. Weight of Asphalt and Mineral matter Extracted, g	28	27
4. Weight of Mineral Matter, g	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	28	27
7. Bitumen content in %	5.60	5.40
8. Average	5.60	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	15.2	15.2	3.2	96.8	90 - 100
9.5	62.8	78	16.5	83.5	70 - 88
4.75	92.3	170.3	36.1	63.9	53 - 71
2.36	47.8	218.1	46.2	53.8	42 - 58
1.18	48.5	264.6	56.1	43.9	34 - 48
0.600	50.2	314.8	66.7	33.3	26 - 38
0.300	44.9	359.7	76.2	23.8	18 - 28
0.150	33.2	392.9	83.2	16.8	12 - 20
0.075	45.2	438.1	92.8	7.2	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	19.6	19.6	4.1	95.9	90 - 100
9.5	63.2	82.8	17.5	82.5	70 - 88
4.75	95.7	178.5	37.7	62.3	53 - 71
2.36	45.2	223.7	47.3	52.7	42 - 58
1.18	56.1	279.8	59.2	40.8	34 - 48
0.600	50.2	330	69.8	30.2	26 - 38
0.300	47.8	377.8	79.9	20.1	18 - 28
0.150	30.5	408.3	86.3	13.7	12 - 20
0.075	32.6	440.9	92.2	6.8	4 - 10

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